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On behalf of the University Engineer's Club, the Editor of Non Loqui wishes to express his thanks for the following invaluable financial assistance, which enabled the Club's representatives to attend the 1971 A.N.E.S.A. Symposium at the University of Melbourne.

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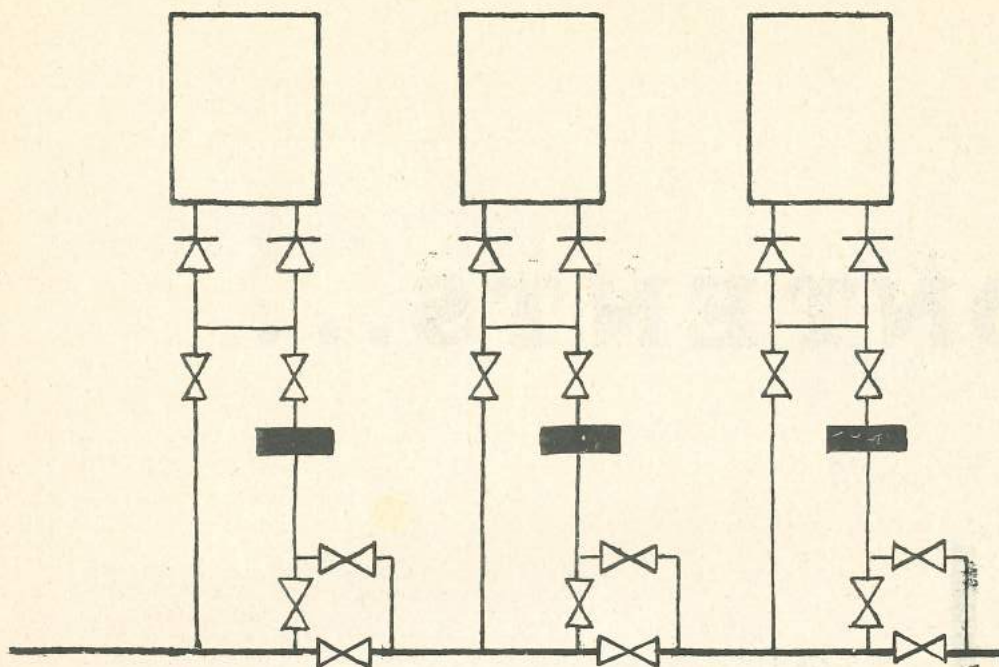
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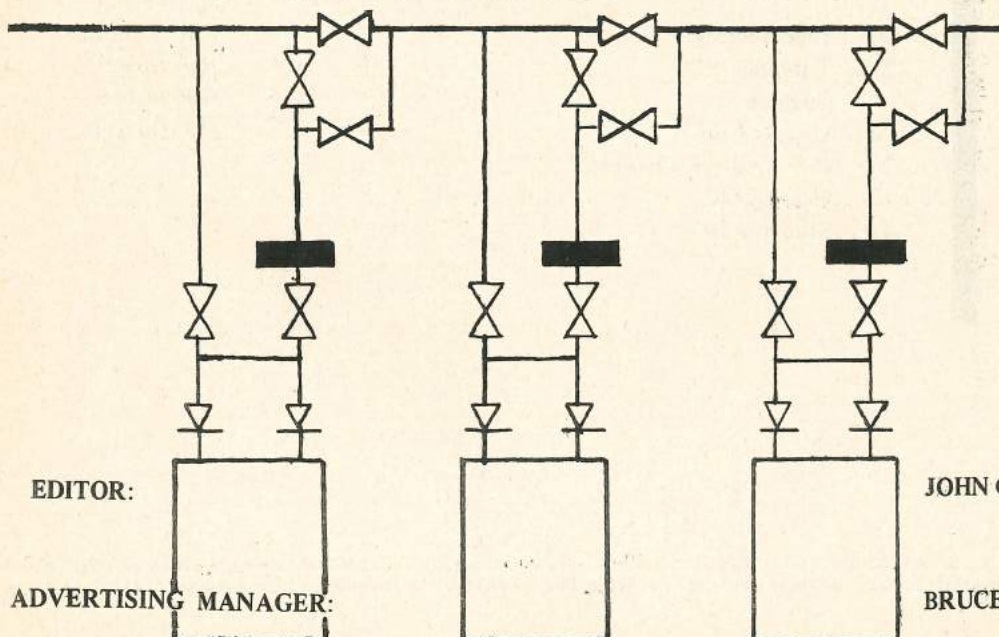
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NON LOQUI

Official Magazine of the University of Western Australia Engineers Club



EDITOR:

JOHN CHRISTOU

ADVERTISING MANAGER:

BRUCE DOUGLAS

With thanks to Maria and Keng Ang, who helped; and J.J., who didn't.

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CREDITS:

The cartoon on page 33 is by Tanner and appeared in Sydney's Daily Telegraph; the cartoon on page 44 is by Atchinson and appeared in the Advertiser; the photograph on page 18 is from The Journal of the Institution of Engineers, Australia, v 43, n 1-2, Jan-Feb 1971, page 13.

Editorial



The modern trend of the educative process is specialization, and as a product of the education system engineers are more often held responsible for the so-called "environmental ills" of the world than any other single group. Engineers usually receive blame, but not recognition – "if it works, it's a scientific achievement; if it doesn't, it's an engineering fault!"

The ethical code of the engineer, as published by the Institution of Engineers, Australia, requires that engineers "strive constantly to widen their knowledge and improve their skill....." What really matters is surely not the factual knowledge by itself, but the ability and initiative to procure the facts, to think about them and to question them.

Consider the oath proposed by Meredith Thring for the Engineer of the future: "On becoming a chartered Engineer I vow to use my best endeavours to consider how my engineering skill may contribute towards the happiness of Mankind....." Thring considered that every engineer should have to pass an examination on the social responsibilities of the engineer, and Professor J.F.D. Wood, of the University of N.S.W. feels that the I.E.A. should require "the inclusion of Liberal Studies in professional engineering courses as a condition for recognition."

Modern Man's obsession with technological know-how is typified by the present U.S.A. Space Programme. "The Apollo decision," says a former N.A.S.A. attorney, describing how the U.S.A. decided to go to the Moon, "was made without reference to any comprehensive and integrated National policy designed to maximise the use of scientific and technological resources for social objectives It was a typical Cold War reaction." The reasons for the project are worth remembering: first, the need for a "national goal"; second, prestige – from a "project impressive to mankind"; and third, advancing space exploration. Improving scientific knowledge was a poor fourth.

The latest engineering progress in the field of automation and the computer, integrated by vastly expanded communications and information systems, is permeating modern warfare technique to an extent hitherto unimaginable. Since 1918 the outcome of armed conflict has come to depend increasingly on the mobilized intelligence of academics, scientists and engineers who had never smelled powder. It is thus no coincidence that the centre of conflict in the 1970s is shifting closer to areas where weapons are manufactured and to where people who will design and control them are trained – the University.

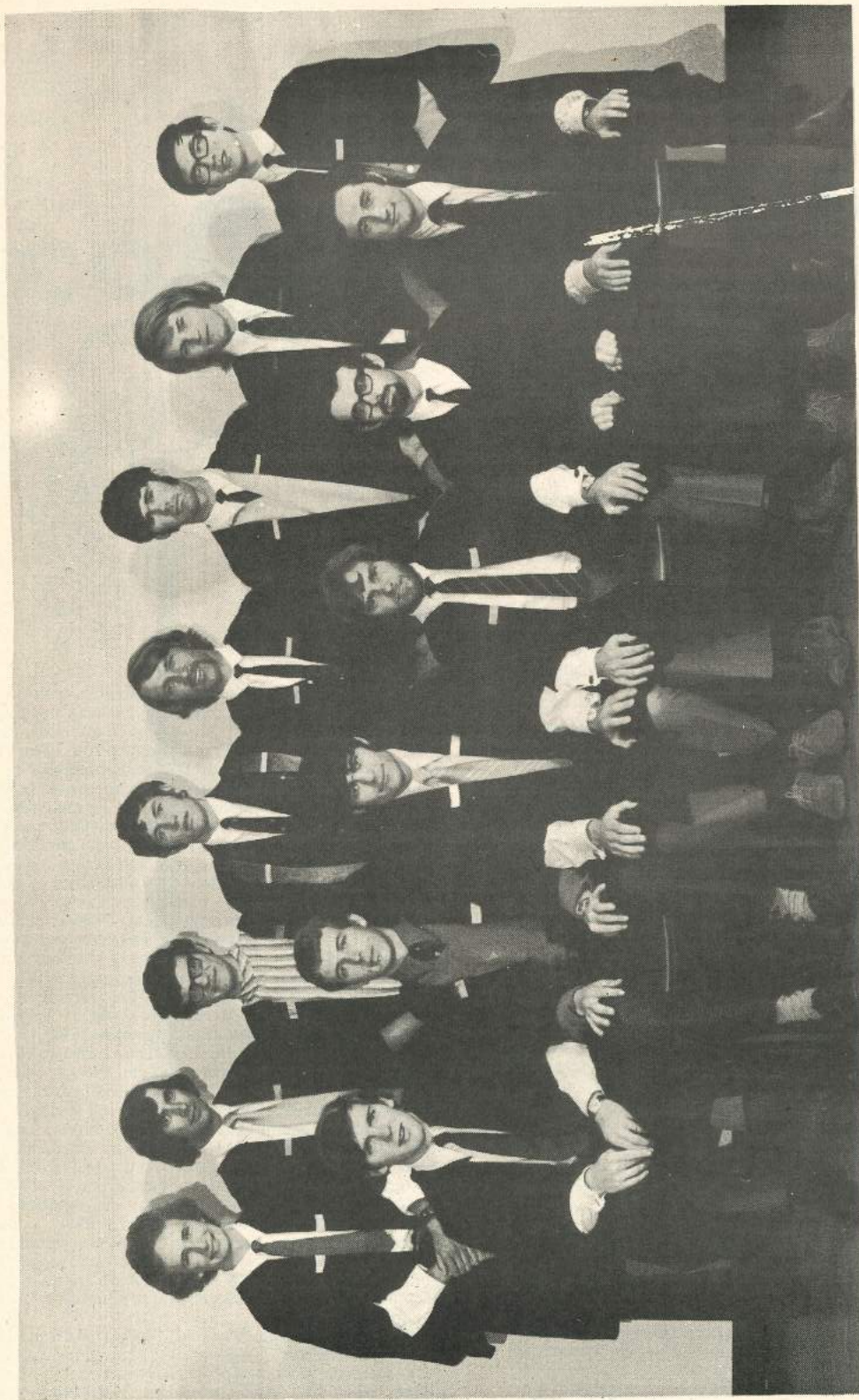
Weapons of global destruction illustrate a truism about all technology today: that, while it may not yet be out of physical control, it is already, in many cases, out of moral control. The machine is amoral; so too, I fear, are the men who create and promote that technology. In part this is the result of man's myopia: he devises machines whose immediate utility is apparent, but his analysis stops there; he fails to see the long-term consequences.

It is clear that 20th Century man has the greatest difficulty in contemplating steadily, and acting consistently towards, any time horizon more than a handful of years ahead. Governments contemplate elections every four or five years, the more enterprising defence ministries and oil companies may sketch out plans for some ten years ahead. But that is about it. On this showing, we shall begin to take the end of the century seriously around 1990.

In 1966, Chauncey Starr, dean of Engineering of the University of California, Los Angeles, spoke of "criteria of wisdom" as a necessary part of the education of the Engineer. Unfortunately, the University caters to the demands of a competitive world and the extra subjects and examinations introduced have resulted in longer, more rigid, timetables. These pressures, felt strongly by student and staff members alike, have produced a factory-like atmosphere. The total lack of genuine relationship between so much of what is done and the real needs of the students produces school-room discipline in what should be a centre for creative thought and experimentation. In this corrosive atmosphere the student is driven into sullen apathy and the teacher into resigned indifference.

Perhaps our university is not far removed from a large scientific society in the U.S.A. in which an argument on the implications of the Vietnam war produced the following comment:

"Before we consider Vietnam, I think we should take a ballot on the naming of element 97, Berkelium. I never really liked that name and propose we change it to Cantabrigium, which has a much nicer cant. I can think of other ridiculous possibilities."



1971 U.E.C. COMMITTEE:

*P. Surridge, N. Cinquina, C. Crisafulli, R. Eddington, J. Christou, R. Spence, A. Hill, H. Tey,
R. Howe, P. Barnett, C. Fitzhardinge, (Vice-President), R. Candy (President), R. Carpenter
(Secretary), B. Cooperman (Treasurer).*

President's Report.



1971 was a year marked with ups and downs. However, it was a very significant year in more ways than one and will go down as one of the club's best.

1921 saw the humble beginning of what was to become one of the most influential clubs on campus. We celebrated the club's 50th Anniversary this year. It is fitting that what will be the last of the initiation ceremonies performed as a tradition by the club occurred in its 50th year. Pressure from outside bodies has finally brought the ceremonies to an end. Undoubtedly the club will survive; however, if the next fifty years are to be as successful as the past ones a suitable replacement must be found. It is essential that First Year students be encouraged to take on an active role during the period of their membership. To use an old cliché — a club is only as strong as its members.

Imagination and boldness are two additional ingredients required if the club is to remain a success and avoid becoming a sterile institution. I believe steps were taken in the right direction this year when many new ideas were implemented. For example, the Ball being held at Ascot, while not a total financial success, stimulated a lot of interest inside and outside the club and certainly deserves a second chance. I am sure that the courage to hold a similar ball next year would be rewarded with a better response by club members.

Carrying off the Goyder Cup honours for the first time in three years reflects the healthy state of the club and it is to be hoped that this is only the beginning of a long string of firsts.

A film of various club activities throughout the year has been compiled. This is an interesting development in preserving the club's history normally restricted to hand written articles appearing in "Non Loqui". Films such as this one will surely make very entertaining viewing in the years to come.

While the future of the club is in the hands of the people interested enough to run the administration, they need support and co-operation. Communication is the vital link now that the club is increasing in members. An important part of the communication is feed-back in the form of constructive criticism. Otherwise the administration will lose track of the members it represents.

Finally, I would like to thank the club members for giving me the honour of being their President in 1971 and for the co-operation I have had throughout the year.

RUSSELL CANDY

THE ENGINEERING PROFESSION . . . POVERTY OR PROSPERITY?

Censorship Classification
D.E.O.
(Devoted Engineers Only)

After four years of one of the most intensive training courses available, how will your rewards compare with those of your professional contemporaries? The answer is a terse — appallingly!

In Victoria, in June of 1969, 28,810 questionnaires were distributed to people in a variety of professions in the latest of a series of investigations into professional salaries. The response to these questionnaires was as shown below:

Analysis of Response

<i>Profession</i>	<i>Number of Questionnaires Mailed</i>	<i>Number of replies</i>	<i>Response Per Cent</i>
Accountancy*	10,292	5,831	57%
Agricultural Science	719	478	66
Architecture	1,050	532	50
Chemistry	1,453	954	66
Dentistry	932	383	41
Engineering	5,823	3,850	66
Hospital Science	115	58	50
Law	2,292	1,011	44
Medicine	4,013	1,732	43
Optometry	168	72	43
Physics	382	244	64
Psychology	363	238	66
Social Work	426	203	48
Surveying	416	230	55
Veterinary Science	366	214	58
ALL	28,810	16,030	56%

(Note the relative response from engineers and that from, say, dentists or doctors. The reasons for this difference will become apparent).

To commence the process of disillusionment, the next table shows the median income and age for each of various professions.

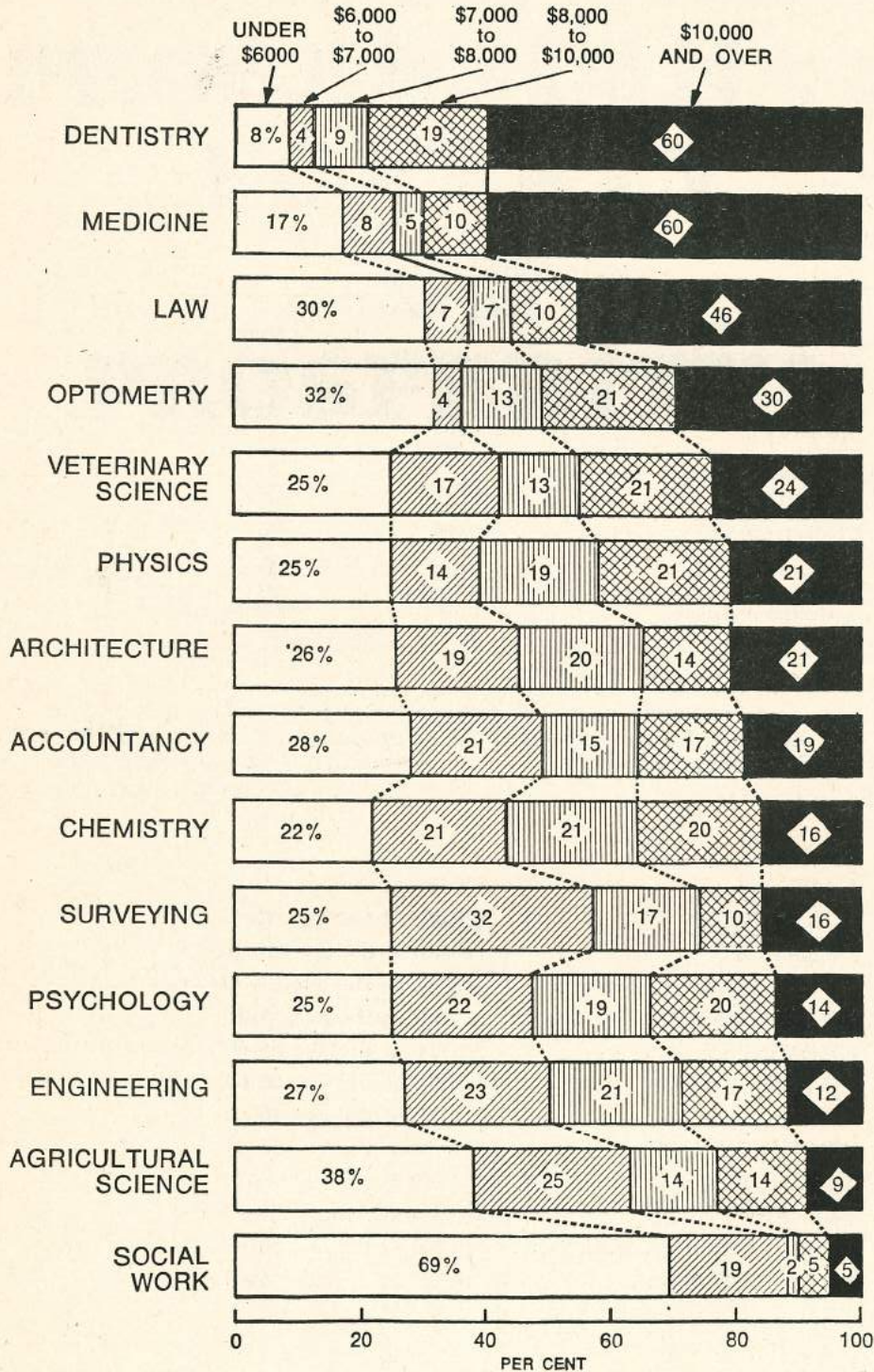
<i>Median Incomes and Ages</i>		
<i>Profession*</i>	<i>Median Income \$</i>	<i>Median Age (Years)</i>
Medicine	11,000	42
Dentistry	11,000	42
Law	8,820	43
Optometry	8,000	43
Physics	7,350	39
Veterinary Science	7,300	34
Chemistry	7,120	42
Architecture	7,100	43
Accountancy	7,000	43
Psychology	7,000	39
Engineering	6,950	39
Surveying	6,510	39
Agricultural Science	6,380	38
Social Work	5,280	34

It was also shown that, for each profession, one quarter of its members earn, at some stage of their working lives, incomes in excess of the following:

LAW	\$20,000 at the age 41-45
MEDICINE	\$20,000 at the age 41-45
DENTISTRY	\$16,000 at the age 41-45
VETERINARY SCIENCE	\$15,000 at the age 36-40
OPTOMETRY	\$14,000 at the age 41-45
CHEMISTRY	\$13,000 at the age 56-60
PHYSICS	\$12,300 at the age 56-60
SURVEYING	\$12,000 at the age 46-50
ARCHITECTURE	\$12,000 at the age 56-60
PSYCHOLOGY	\$11,050 at the age 56-60
ACCOUNTANCY	\$10,800 at the age 56-60
AGRICULTURAL SCIENCE	\$10,700 at the age 56-60
ENGINEERING	\$10,500 at the age 56-60

Further, the relative range of incomes for the professions under consideration is displayed as follows:

PER CENT OF MEN EARNING



"Ah! But.....", you are saying, "..... engineering includes people qualified in institutions other than universities.

Included among other tables was a comparison of incomes for people qualified to various standards. For Engineering it showed an average difference of 15% between the salaries of those with degrees and those with diplomas.

Incomes According to Qualifications

<i>Qualification</i>	<i>Lower Quartile</i>	<i>Median</i>	<i>Upper Quartile</i>	<i>Median Age</i>
University degree	\$6,300	\$7,550	\$9,140	41
Other Tertiary diploma	\$5,470	\$6,500	\$7,540	36

Finally (the straw?), a matter of great controversy for engineers in 1970, the relative movements of incomes in the last decade:

Movements in Incomes in Professions 1956 – 1969

<i>Profession</i>	<i>Percent increase in income</i>
Accountancy	122.5
Agricultural Science	104.9
Architecture	96.1
Chemistry	108.2
Dentistry	166.7
Engineering	75.5
Law	90.9
Medicine	90.3
Optometry	Not Available
Physics	Not Available
Psychology	Not Available
Social Work	Not Available
Surveying	80.8
Veterinary Science	Not Available

In conclusion, it appears that you, as an engineering student, are unyielding devoted and dedicated to the cause – what other reason could you have for doing it??

(Facts obtained from “Professional Incomes in Victoria – June, 1969” compiled by K. Grovell)

I.D. CATTO

DESERT DILEMMA

This problem was presented to graduates of a large French university.

Lost in the desert you stumble upon a large water pipe which supplies water to a nearby city. Having no other means of determining direction you logically consider that knowledge of the direction of flow in the pipe will assist your efforts to return to civilisation. Fortunately, you happen to be carrying a bag of common plumbing tools. Without cutting or otherwise interfering with the pipeline how do you determine the direction of flow and hence find your way out of the desert?

Solution Page 44.

D. ALLAN

LIBERAL STUDIES FOR ENGINEERING STUDENTS.

By J.F.D. Wood, B.Sc., B.E., F.I.E. Aust. Professor
of General Education and Head, Department of
General Studies, University of New South Wales.

The idea that professional people should have a broad academic training is not a new one in this country, as, before the end of last century, would be Engineering students at Sydney University had to do Arts first, while Arts students were given a short compulsory course in Elementary Science.

As scientific and technological knowledge grew, it was felt necessary to devote more and more of the available class time to such studies and liberal studies completely disappeared from engineering courses. Since 1948, when the University of New South Wales included liberal studies in its first degree courses, there has been a slow movement back towards a broader education for engineers, but many Australian universities and institutes of technology still lag far behind their counterparts in the United States of America and even the Polytechnics and former Colleges of Advanced Technology in the United Kingdom.

Before World War II most university engineering students in the United Kingdom lived in colleges or halls of residence with students in a variety of other disciplines, and a great many of them came from families with some background of tertiary education. In these circumstances it was generally held that private reading and extra-curricular activities provided all the broadening that was needed. The situation was very different in Australia and the United States of America where the proportion of first generation students in the Universities was much higher and the proportion in colleges much less than in the United Kingdom.

Engineering educators in the United States of America realising this devoted 15 to 20% of class time to liberal studies, but in this country the time allocation ranges from zero to only 10%.

Among the claims made by the advocates of liberal studies are the following:

(a) the engineer who has received a broader education is likely to be a better citizen more able to play his part in public affairs;

- (b) the engineer who studied appropriate non-technical subjects is likely to be a better engineer, because, for example, he can appreciate the social consequences of his work and understand better the motivation of those who work for him;
- (c) his liberal studies may introduce him to new fields which he may later cultivate as leisure time interests.

While the majority of graduate engineers will probably agree that the inclusion of liberal studies in undergraduate courses is desirable, there is little agreement as to what subjects should be included under that heading.

Some favour what the Americans call "Tool" subjects — Report Writing, Spoken English, Elementary Foreign Languages, Accountancy, etc.

Others want to include "Complementary" subjects, that is subjects which may be directly connected with the main subjects of study — Engineering Administration, Industrial Psychology, History of Engineering, etc.

Others again prefer "Contrasting" subjects taken from the established disciplines in the Humanities and Social Sciences.

A further group believe in concentrating on topic-oriented subjects of an interdisciplinary nature.

There are also marked differences of opinion as to whether students should have a completely free choice of liberal studies subjects, should follow a single set program or have an arrangement requiring them to select one or more subjects from each of a number of specified areas.

It may be of interest to consider the changes in the Liberal Studies programme at the University of New South over the period since 1948 and possible changes contemplated for the future.

The original programme gave students no choice of subjects, requiring all in four year full-time courses to devote 48 hours to Liberal Studies in each of Years 1 and 2 and 72 hours in each of Years 3 and 4. The programme

consisted of four consecutive courses in Language and Literature, three in Human Relations and two in Contemporary Civilisation with single courses in Scientific Method and History of Science and Technology. The whole of the class time was officially devoted to lectures, but, at least in the higher years, the number of students in each class was often sufficiently small for it to be conducted as a tutorial.

By 1954 a certain amount of choice had been introduced into the programme, which now devoted 48 hours each to English and History, 24 hours each to Logic and Philosophy, 24 hours to a Minor Elective and 72 hours to a Major Elective. The Minor Electives offered were:

<i>Philosophy of Science</i>	<i>Government</i>
<i>Philosophy-Logic</i>	<i>Two different courses in</i>
	<i>Psychology</i>
<i>English</i>	<i>Economics</i>
<i>History - three different courses</i>	

The full range of Major Electives was:

<i>Philosophy</i>	<i>Government</i>
<i>English</i>	<i>Psychology</i>
<i>History</i>	<i>Economics</i>

The 1958 programme still required a total of 240 hours attendance, but differed from the 1954 arrangement in substituting a Social Science Elective of 48 hours (generally a second course in a subject already taken) for the Major Elective.

<i>Subject</i>	<i>Enrolments</i>	<i>Lecture Classes</i>	<i>Tutorial Classes</i>
<i>History of Fine Arts</i>	120	2	6
<i>History of Architecture</i>	80	1	4
<i>Psychology</i>	900	10	51
<i>Economics</i>	1020	11	51
<i>The Arts and Crafts</i>	120	2	4
<i>Music</i>	280	8	16
<i>English</i>	640	15	36
<i>History</i>	650	14	39
<i>Philosophy</i>	500	12	29
<i>Sociology</i>	160	2	8
<i>Political Science</i>	560	8	32
<i>An Introduction to Modern Drama</i>	90	2	4
<i>Cosmology</i>	210	3	9
<i>German Literature and Civilisation</i>	40	1	2
<i>Japanese</i>	40	1	4
<i>The Environmental Situation</i>	25	1	2
<i>Totals</i>	5435	93	297

TABLE I: CHOICE OF LIBERAL SUBJECTS

If timetables permit and the Head of the relevant school agrees, it is possible for students to substitute an appropriate Arts or Commerce subject for two General Studies subjects.

The normal arrangement is for students to attend one lecture per week and one tutorial class per fortnight for 28 weeks. Lecture classes may have as many as 120 students, but tutorial classes are limited to 20.

Methods of assessment vary from subject to subject, but there has been a tendency in recent years to move away from reliance on final examinations to a system of continual assessment which takes account of essays, class tests and performance at tutorial sessions.

The first serious attempt to assess the students' attitude to Liberal Studies was made in 1959 when a questionnaire was sent to the 500 odd who had graduated in Engineering up to that time. Of the 322 who replied, about 85% either agreed or agreed strongly with the University's policy of including compulsory Liberal Studies in Engineering courses, while a similar percentage thought the time allocation for these subjects should either remain the same or be increased.

At this stage the Social Science Electives were Economics, Government and Psychology while the Advanced Electives were English, History, Philosophy, Economics, Government, Psychology, and Painting, Sculpture and Allied Arts.

A general review in 1961 reduced the total hours of class attendance in Engineering degree courses to about 2600 hours and the Liberal Studies allocation from 240 to 180 hours. Liberal Studies subjects disappeared from 1st year, the 60 hours in 2nd year was devoted to English, and that in 3rd year to a 30 hour course in History or Philosophy and a 30 hour course in a Social Science Elective. A 60 hour Advanced Elective was included in 4th year.

The present situation is that most Engineering students take one 42 hour Elective in 2nd year, two in 3rd year and either a fourth Elective or an Advanced Elective in 4th year.

There is no restriction on choice of subjects other than those imposed by timetable clashes and the subjects offered are as shown in Table I below. Some indication of the relative popularity of the different subjects is given by the enrolment figures.

1971

Table II, based on replies to questionnaires, gives some idea of the attitude of students in Years 1, 2 and 3 and graduates to the idea of including General Studies subjects in first degree courses.

Only repeat students in 1st year would have had direct experience of General Studies subjects, 2nd year students would in most cases be taking a General Studies subject at the time of the enquiry and most 3rd year students would have completed one General Studies subject and be currently enrolled in two more.

Status of Respondents	Number	Percentage Favoured General Studies		Percentage Against General Studies
		Some Value	Most Valuable	
Year 1	2213	90-	31	10+
Year 2	555	80+	25	20-
Year 3	1593	90		10
Graduate	156	85		*7

* In this case, about 8% of respondents were non-committal

TABLE II: STUDENT ATTITUDES TOWARDS LIBERAL STUDIES

It is interesting to note that 48% of graduates said that they had looked forward to taking the courses and were still glad they had taken them, while 37% said that they had not looked forward to taking the courses, but were now glad they had taken them.

3rd year students were asked for their views on both teaching and assessment methods. The majority favoured classes in which time for discussion was provided rather than straight lectures, while with respect to the provision of tutorial and seminar classes, 36% wanted more than at present and 51% thought there were already enough. 52% thought that there should be some assessment and that it should be based on ALL the work that a student does, while 33% felt that participation in class discussion should not be counted. Only 4% felt that assessment should be based solely on final examinations, while 11% felt that there should be no assessment at all.

Following a lengthy discussion of the report prepared by the Tertiary Education Research Centre, the Council Committee's main recommendations to Council were that:

- (a) The policy of including a general education component in undergraduate courses be maintained.

- (b) There should be no decrease in the range of options.
 (c) No course proposed for inclusion among the General Studies electives should be rejected merely on the ground that it has direct relevance to the professional interests of some of the students who may take it, provided that such a professionally oriented course may be approved only if it is clearly one which could be profitably studied by a student in any professional course.
 (d) Any General Studies subject prescribed by a faculty as a COMPULSORY component of one of its degree programmes, will not count as part of the General Studies component of that course.

The University Council is satisfied that the experiment in broadening the education of undergraduates, which it commenced in 1948, has proved worthwhile. It remains to be seen whether universities and institutes of technology which have so far done little or nothing to broaden their courses will follow suit. Perhaps this will not happen unless or until the Institution of Engineers, Australia, follows the example of the Engineering Council for Professional Development in the United States of America, by requiring the inclusion of Liberal Studies in professional engineering courses as a condition for recognition.

RED LIQUOR

Sparkling, the red liquor lying in the glass.

 Tempting,

 Inviting,

 Like woman's red lips;

It tastes bitter!

Soften the lead-heavy head,

Departure from reality.

 Touching clouds,

 Temporarily,

 Circling to infinity.

The love

Springs from nothing,

 Nowhere.

Bitter taste, like the liquid,

But against the cool atmosphere it offers

 Inner feeling,

 Generates courage.

Door knocked,

Who's that?

 No answer,

 No response.

Why should I conceive there is anyone else,

 Whether He is all-powerful or inhuman?

My red liquid,

It's real:

That's all I care!

Bitter taste,

Running down.

Shall be filled,

Will be filled!

Life goes on forever.

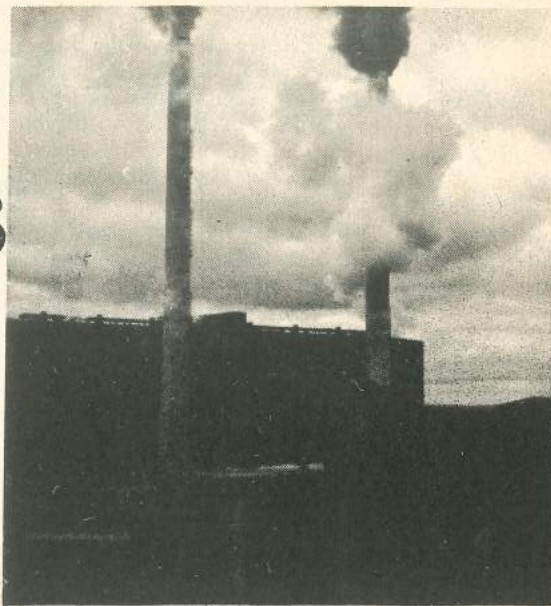
K.L. ANG

EYESORES

The Oxford Dictionary defines pollution as "the destruction of the purity of sanctity" of the subject under discussion. Hence, noise, the contamination of air or water by industrial wastes, devastation of land, interference with nature, or, indeed, anything contributing to ugliness are, by definition, creating environmental pollution.

In the past few years the world in general has become very conscious of the threat of pollution and millions of dollars are being spent in an effort to maintain an ecological balance. It is alarming, therefore, to find that here in Western Australia the State Electricity Commission is guilty of polluting our state in several ways.

One has only to step out into the street to see evidence of the S.E.C.'s persistent disregard for beauty. Overhead transmission poles, skeletons of once living trees, stand stark and ugly; and as long as they stand Perth will never compare with overseas capitals where high voltage transmission lines are increasingly being replaced by underground cables. The cost of conversion to underground cable is considered prohibitive by the S.E.C., yet overhead transmission wires, quite apart from being unsightly in their own right, are potential death traps: not only for people, but also for the natural bird life.



The wires taking power to Northam lie right across the immigration flight of the black swan and result in the death of many of this rare species.

The S.E.C.'s gravest sins, however, are committed well away from Perth where few people acknowledge them. Just thirteen miles from Collie, surrounded by a beautiful forest, stands the Commission's flagship: Muja Power Station, churning out 240 MW of electricity towards Perth and a corresponding amount of pollution into the atmosphere.

Muja is a coal-fired station and as such should have precipitators to clean the combustion gases before they are discharged from the stacks: but it hasn't. This seems to have no apparent or immediate harmful effects. The growth of trees hasn't been stunted and there are no residents close enough to be irritated by this pollution. But what the S.E.C. doesn't seem to realize is that these gases together with the rest of the world's waste gases are accumulating in the upper atmosphere and are thus posing a very real threat to future life on earth. Eminent scientists and ecologists are convinced of this, and yet, uncontrolled air pollution is allowed to continue, simply because it is at present well away from any established townsights.

Coal may be mined by one of two methods: conventional deep shaft mining, which leaves little evidence of what is going on below; and open-cut or strip mining, where all vegetation is bulldozed away and access to the coal is achieved by excavating the dirt and rocks above the seam — leaving a permanent, ugly scar on the otherwise untouched countryside.

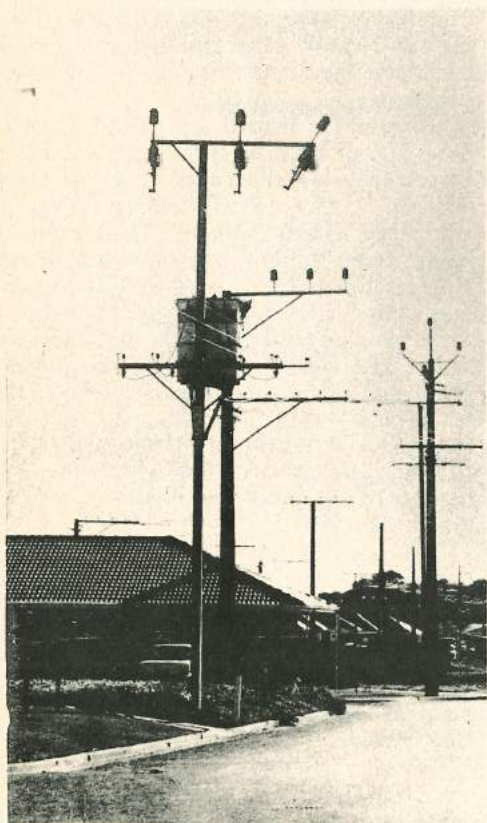
The S.E.C. is the biggest, if not the only, buyer of coal in the area. Hence it wields considerable influence, since without its patronage the mining companies would be forced to stop production. Yet it does nothing to stop this devastation.

The landscape of the Collie-Muja district viewed from the air is pockmarked with abandoned open cuts, often containing dirty water: yet no attempt has been made to instigate re-afforestation programmes.

We, here, in Western Australia must take note of what has happened overseas. In the U.S.A., 3,000 square miles have been ravaged by strip miners, and only about one-third has been given any reclamation (often unsuccessful). Furthermore, valuable waterways are being fouled by acids and life-sapping siltation caused by the changes in earth strata and contours.

Clearly the damage here is not yet as widespread, but we must carefully consider the consequences before despoiling the earth for immediate profit. Open-cut mining is like knocking back a dozen martinis: you are riding high as long as the coal lasts, but the hangover comes when the coal is gone: the jobs are gone: the land is gone: and the bitter truth of the morning after leaves only a barren landscape and a mouthful of ashes.

CONRAD CRISAFULLI



Bend

Sinister

Engineers are traditionally illiterate and apathetic. However, it has been pointed out that the Arts Faculty has no regular magazine.

Bend Sinister was produced promptly this year and it contained a surprising variety in both material and writers. As well as the usual sport and social coverages, articles ranged from music critiques to beer recipes.

John Christou tried admirably to create discussion in the magazine with his excellent series of articles on engineers and the way they are educated to think. However, Bend Sinister was apparently not destined for this lofty ambition.

The Association of Professional Engineers of Australia communicated with us over salaries for engineers on two occasions and the "Letters to the Editor" section was kept busy. Occasionally the typist (whom I must thank deeply for a great service to the club) and the librarian would air their views or complaints. One surprising feature was the amount of poetry given to me. In one issue an opinion poll was conducted on initiations and a good response was gained from the initiated.

I myself attempted to churn out editorials concerning the few facets of the university life of an engineer and rejected the suggestion to abandon stencils for the more professional offset printing as this would have destroyed the dual purpose of the magazine; that of communication and that of providing students with note paper.

To sum up, in spite of, and perhaps because the eternal badgering for articles an editor has to do, the magazine was well-read and therefore successful.

JOCK HOWE
Editor of Bend Sinister

POSTGRADUATE RESEARCH : CIVIL.

Research is to see what everybody else has seen, and to think what nobody else has thought.

THE DESIGN OF "ROADED" CATCHMENTS FOR FARM DAMS

Improved catchments for filling farm dams are needed in many areas. The most obvious way to produce these is to seal the soil surface, but so far no method has been found which is both effective and cheap enough for farm use.

The "roaded" catchment was developed in Western Australia in the 1950's and consisted of a series of parallel, formed and compacted earth "roads" running downhill with a system of connecting channels at the lower end. The "roads" currently used have a triangular cross-section with side slopes from 0.1 - 0.25; widths from 15 - 100 ft. and lengths from 300-2,000 ft.

"Rules of thumb" for the design of these catchments for non-erosion have been developed in W.A. However, even if these rules work satisfactorily here, they are not applicable in other parts of the world. Nor do they give any indications of the relative efficiencies of alternative lay-outs for a particular site. Thus this project aims to do two things. The first is to produce nomograms for the calculation of the maximum non-erosive grades for the "roads" and collecting channels. For these to be useful it is also necessary to develop a simple field test to measure the erosion resistance of soils. The second to produce design charts to enable the efficiency of catchments to be optimised. A computer simulation model of the "roaded" catchment has been developed and is being used to do this.

M. HOLICK

THE ROTATION CAPACITY OF CONCRETE ENCASED STEEL BEAMS

Limit design methods for statically indeterminate structures require a knowledge of the moment-curvature characteristics of the constituent structural members. Lack of such knowledge has prevented the use of limit design methods for concrete encased steel beams. In fact it is only relatively recently that the concrete encasement, used principally to render the steel beam sufficiently fire resistant, has been quantitatively recognised as contributing to the ultimate strength of the member. The increased lateral stability provided by the encasement still requires further investigation.

The present investigation is aimed at predicting the rotational behaviour of the composite member under conditions similar to those encountered in practice. Hence both constant moment and moment gradient cases were included in the study. Other variables investigated were concrete strength, amount of encasement and the quantity of transverse binding in the form of stirrups.

Conventional methods of analysis of the beam cross section, coupled with appropriate, experimentally obtained formulae for the maximum concrete strain have provided moment-curvature curves which show fairly close agreement with the experimental curves.

P.J. NADEBAUM

HIGH SOCIETY

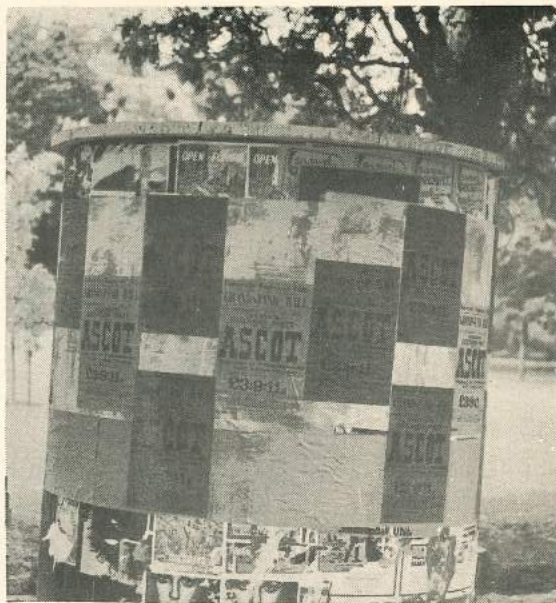
The social calendar for 1971 consisted of all the traditional functions, (such as the Ball, Dinner, car trial, Common Room shows) and some new ones: a Wine and Cheese evening, Ocean Cruise, and a much-improved Asian Night.

The changes went even further. An ambitious social committee changed the ball from its traditional venue to the opulence of Ascot Ballroom. The Annual Dinner was also moved; to the exotic Hellenic Community Centre. The wines for this latter occasion were all West Australian; and all carefully selected by our own conscientious committee in the course of three weekends of wine tasting.

Our aim was high this year as there was an allowance of \$2,000 for social expenditure. Unfortunately, the average student Engineer couldn't see the advantages of going to highly-subsidized shows, so the turnout, though adequate, was a little disappointing.

Nevertheless, we managed to get through our budget — or the better part of it — and all who helped themselves to their share had a great time doing it.

C. CRISAFULLI



TUBBING

Tubbing, unfortunately, has lost all excuse for being organized over the past few years. During two years all feeling of competition has escaped from the event, leaving only a wild, childish game. However enjoyable this may be for the participants (and they be few), it leaves an agonized smile on the faces of the organizer and spectators.

Surprising as it seems, a reasonable amount of thought and effort has to be invested for the happening to occur; the display resulting from this year's "thought and effort" shows that the latter was not worth it; even though the weather was perfect and the crowd quite large, initially.

Bruce McNaught did an admirable job of starting and then judging the fracas.

Participating were: Engines, Architecture, Medicine, Agriculture and Education plus a few non-descript girls' teams. (The Social Workers entered but were too afraid of the water to participate). Channel 7 entered its own team which did its thing thirty yards up the beach, purely for its own interests. Other channels were covering the event.

This event, which was designed for fun and which gained a modicum of tradition over the years has now self-destructed. Someone with enough mental ill-condition might be able to resuscitate and organize it as it should be organized in the future.

JOCK HOWE



TUGGING

Following the traditional chest-beating procession, the two faculty teams, Engineering and Medicine, rendezvoused on Riley turf whereupon a hawser (of dubious origin) was strung out and loosely strained amid crowds of blood-thirsty onlookers.

Suddenly, the snide side of Medicine snatched the rope and charged northward towards some convenient trees. This action heralded a horizontal avalanche of organic missiles, clouds of flour and the merry sound of foundation-rocking bangers propagated by supporters and directed at all and sundry, but mainly the contestants.

Despite all this, the worthy engineers flung themselves on the receding rope and (true to form) pulled in unison to reverse the direction of movement. With victory in sight it happened: the rope snapped, leaving the undeserving Med with the greater portion. Being quick thinkers, they retreated and entwined themselves around a trio

of trees. As expected, Engines untangled themselves from the frayed end and organised themselves for an onslaught upon the rope.

Again, a battle raged — a prolonged battle for possession — and this time the air was literally thick with flour. Finally, a new tug-o'-war began back in the arena; and again engineers showed their teeth. Southward went they, over the turf, over the rock wall, through the car park, onwards..... at this point in time, the north end of the rope, inexplicably manoeuvred by the Med students, encircled the rugby posts. Snap went the rugby post and hard laughed the crowd.

The engineers departed rapidly with the rope, in the shock of the holocaust.

From the confusion a cry emerged: "Get the Lawyers!" and the masses surged off to the Law building which was adequately barricaded and populated by rather vocal lawyers. Apart from sporadic missiles and the imprisonment of one female Med student, the action hereon was waning.

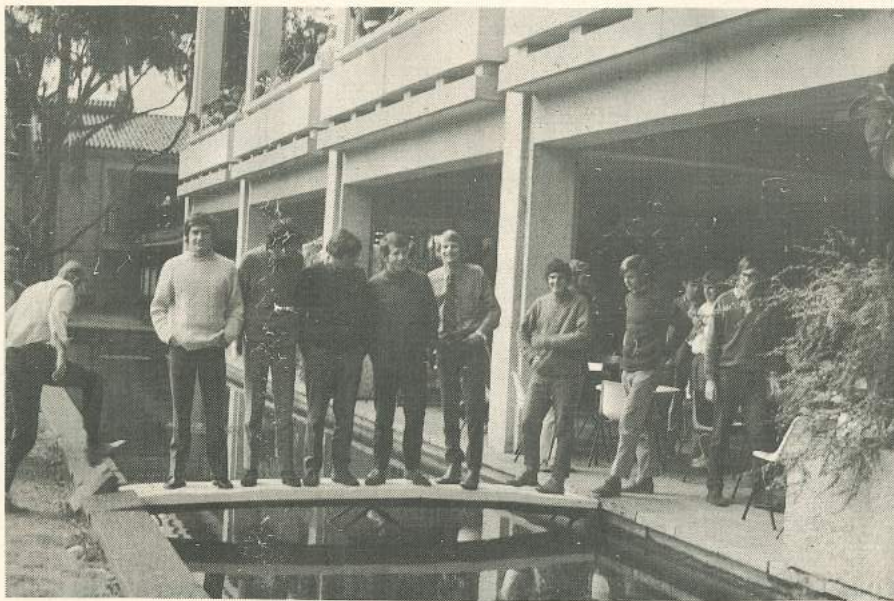
The lawyers declined to give up the trophy, claiming that it was ill-earned, so the engineers dispersed lacking Pride, Rope and Trophy.

G. WALKER

ENGINEERING WONDERS OF THE CENTURY

Nº 185372

The Reid Bridge



.....undergoing full-load test





.....receiving Holy sanction



.....and the sanction of Beauty.



A timid Engineer conducting a survey on the new bridge is viciously assaulted by a savage female student;

GOYDER CUP

BY FAIR MEANS OR FOUL BUT THE SPIRIT WAS THERE

The Engineering Faculty romped in the 1971 Goyder Cup with the most spirited display seen in first-class competition for many a day. The standard was high in all sports and with the great support provided by a large number of scholars ready to "have-a-go", Engineering was able to outclass the other faculties.

By some strange quirk of nature it appears that Engineers cannot swim and so it was that they settled into last place after the opening event — Goyder Cup Swimming. Back on dry land Engineers found their feet and so, as did the Romans before them, they began their great conquest.

With a World's Cup Finals display, Engine's showed teamwork, tenacity and skill to grind home a well-earned win over Arts in this year's premier Soccer event. Tennis was somewhat of a letdown for the soccer had obviously taken the fine edge off the normally brilliant Engineering Sports machine.

The following weeks saw Engineering moulding together a nippy, stylish and extremely solid rugby team which coasted through the preliminaries to enter the final. This was to be a rematch against traditional rivals, Law; who started out as prematch favourites following an intensive recruitment campaign which culminated in the purchase of several "A" grade players. This proved to be very successful when, after a few minutes, the Law backline posted the first try of the match. The conversion was missed. It was now Engine's turn to score and after monopolising the remainder of the half we led 6-3 at half time. The second half saw Engineering attacking tigerishly and consistently but held out by a grim Law defence. Law managed a solitary attack during the half but it resulted in a penalty goal from point-blank range. The final result of that torrid match was a draw: although supporters acclaimed a moral victory for the "Big Strong Silent Men."

Yes! Once again the Engineering Faculty dominated the football scene despite early predictions by football commentators that this could be a year of upsets. Perhaps they were right in some respects.

After convincingly defeating all comers in the elimination round, Engines upset Economics in a one-sided debacle in which Economics was thrashed by six goals. Rumour has it, however, that the only sign of teamwork was on the part of the spectators as they proceeded with the onerous task of emptying the keg. Imagine the potent force Engine's may have been if they had followed the example of the spectators.

This year saw Engineering take the second place honours in table tennis: however, little has been disclosed concerning the reasons for defeat in the final. Chairman Mao has placed a total ban on any dialogue emerging from the tournament with the exception of an acknowledgement that that oversea's student contingent performed very well.

From ping-pong diplomacy to the vigour of basketball where the stark skill and speed of the U.E.C. combination finally met its match. Education, boasting greater height and experience, were able to defeat our boys in the final after a close tussle and only by a narrow margin.

The 1971 Cross-Country proved to be a 'bonanza' for the Arts Faculty and the U.E.C. had to content itself with third position behind education. As for the previous years, the Engine's contingent was chosen only after last-minute selection trials; those who failed to talk their way out of it being the ones selected. Obviously the cream of the Engineering Faculty was finally chosen in this way and, considering that many of them were partly through their training for the Munich Games, they gave extremely meritorious performances.

Goyder Cup Rowing was a controversial affair this year. Eight super-fit, energetic Engineers, plus a somewhat less fit coxswain, took to the water to do battle with the other faculties. Not wishing to assert immediate supremacy, the Engineers contended themselves with a second in the heats and entered the finals full of confidence, only to go down narrowly to Economics. Recognizing the absurdity of such a defeat the Engineers analysed

the situation and concluded that Economics had engaged in a bit of foul play. They had knowingly and maliciously contravened the laws of Goyder Cup Sport by changing their team between the heats and the finals. In addition, they had rowed with a female cox who, quite coincidentally, turned out to be one of those elite female Engineering students. The protest was forwarded and upheld, so Engine's took the honours in Goyder Cup Rowing. The moral of this little story is: brains not brawn win the long run. Never let it be said that you will hate yourself afterwards — none of the rowers had lost his self-respect even after they had pulled off this bit of reverse foul play.

The competition by this stage had settled down to a struggle between Engineering and Education and with only the Hockey to go, it looked as though the Phys-Ed boys had it in the bag, as Hockey had not been the strong point in previous Goyder Cup Engineering teams. Unexpectedly, Medicine proved to be the real opposition in this field, as the Engine's boys went down to them in the final, but not before they had thoroughly asserted themselves as Goyder Cup Champions by decisively thrashing Education 12-0 in the semi-finals.

Engineers slept more serenely that night; knowing full well that they had accomplished what they had set out to do: to bring home the Goyder Cup.

Old champions never die, they are usually buried alive!

GOYDER CUP RESULTS

	ENGINEERING	EDUCATION	MEDICINE	LAW	ECONOMICS	AGRICULTURE	ARTS
Swimming	0	3	8	1	0	2	5
Soccer	8	2	0	0	1	3	5
Athletics	0	8	3	1	5	2	0
Tennis	2	8	5	3	1	0	0
Rugby	6½	2	5	6½	3	0	0
Squash	1	8	3	2	0	0	0
Football	8	3	3	6½	5	6½	0
Table Tennis	5	1	0	0	8	2	3
Basketball	5	8	0	2	0	3	1
Cross-Country	3	5	2	0	0	1	8
Rowing	8	0	3	6½	2	5	0
Hockey	5	3	8	0	0	0	0
Totals:	51½	50	40	28½	25	24½	22

R. DUNSTAN

*The new cinematic emporium
It is not just a super-sensorium,
But a highly effectual
Heterosexual
Mutual masturbatorium.*



IT'S GOODBYE, CHARLES!

It is with regret that I will be retiring at the end of March 1972; having seen some hundreds of students pass through Engineering. During this time I have made many good friends. But my memory will linger on all the good times we have had together. Who knows, we may meet again. My plans are to have a tour around Australia, then to Japan for a long-earned rest. It has been a pleasant experience working with you all.

*So, may I wish you all: Good Luck,
Good Results and a pleasant career.*



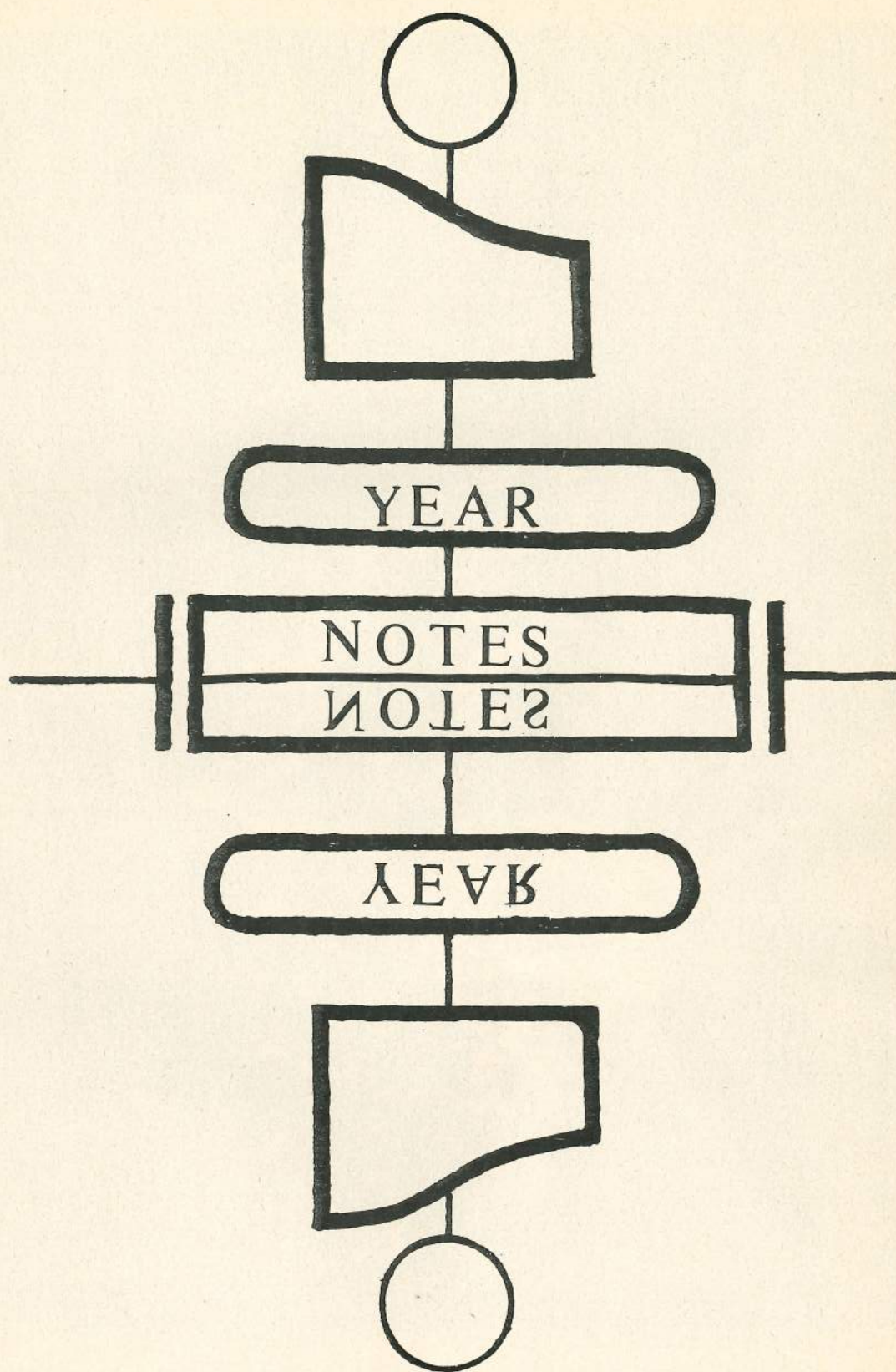
*Yours sincerely,
CHARLES (Janitor)*

For the benefit of the minority, who may not have been around as long as some of us, Charles is our janitor — the ubiquitous uniformed gentleman patiently pointing out the way for visitors to the faculty. No doubt he has told a number of people where to go!

As few of us may remember, it was nigh on seven years ago that Charles first strode majestically into the hallowed halls of this sacred building. Within that period of time Charles has performed innumerable deeds of dedication and assistance, not only for the Faculty but also for the University Engineer's Club. He has become a friend to many of us, commiserating in times of gloom and offering sincere congratulations in more successful times.

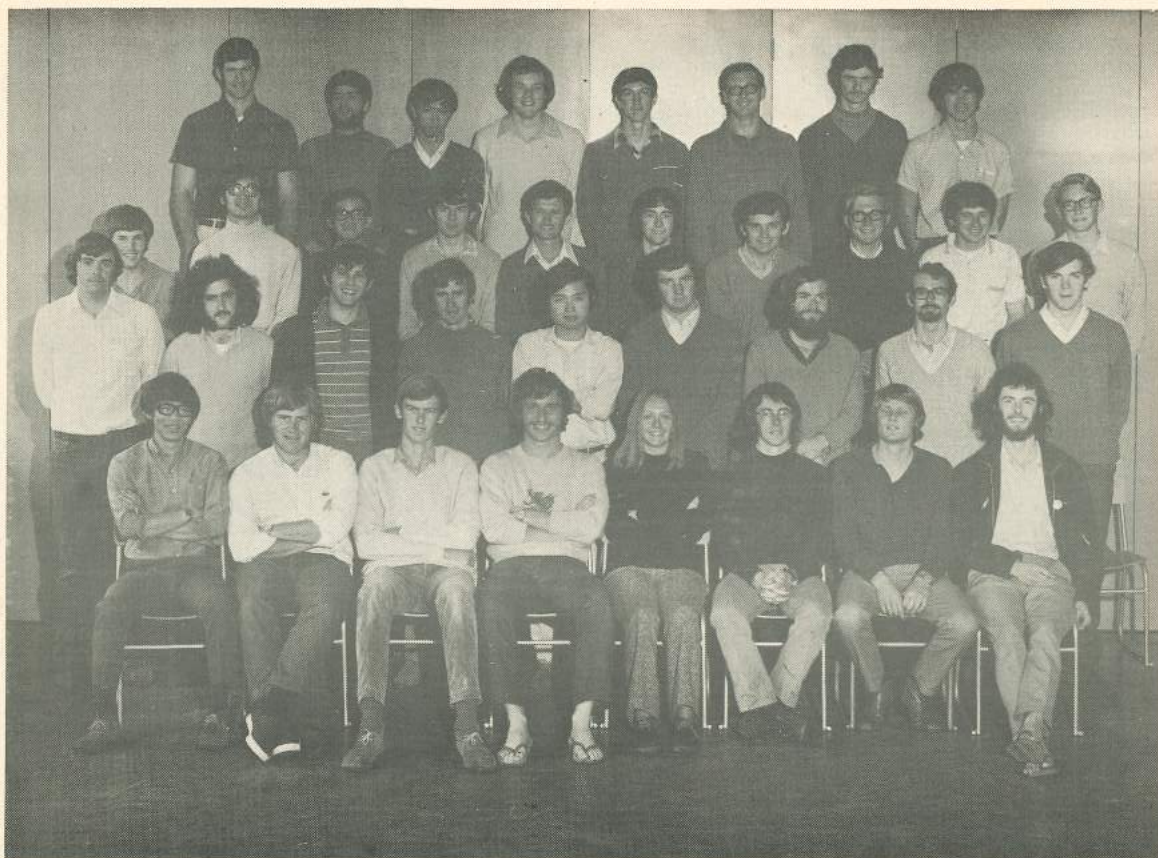
In seven years Charles has left an indelible impression on the Faculty of Engineering. In seven years, Charles, you've cleaned a lot of blackboards after us, now it's your turn to sit back and relax.

Engineering lectures are like some horns — a point here and a point there, with a lot of bull in between.









R. Gibson, G. Georgakakos, R. Ng, M. Davis, B. Zambotti, R. Scolaro, A. Piper, N. Mounsher.

P. Sargent, W. Kwan, L. Ng, R. Ferguson, P. Dee, S. Whiting, S. Lansell, P. Clifton, D. Yates, G. Tytherleigh.

T. Fouracres, L. Faraone, V. Salleo, D. Pearce, E. Chin, R. Reed, J. Hirst, R. Carpenter, R. Howe.

K. Wong, J. Jarvis, B. McNaught, P. Southwell, Miss J. Plante, J. MacPherson, M. Burr, P. Griffiths.

THIRD YEAR ELECTRICAL

PETE GRIFFITHS

"What's the idea of starting at 9.00 a.m.?"

PETE CLIFTON

Representing the Christian point of view through raised eyebrows.

BRUNO ZAMBOTTI

"I'm flexible."

STEVE LANSELL

Class pilot.

MARTIN (CASSA) DAVIS

"But Dr.!"

RAY FERGUSON

Won't keep quiet.

ALAN PIPER

Eats text books.

GEORGE GEORG.....(?!?)

Never stops talking of social injustices, politics, etc.; easily excitable.

RAY GIBSON

Trying to integrate married life in Electronics.

ROB STEELE

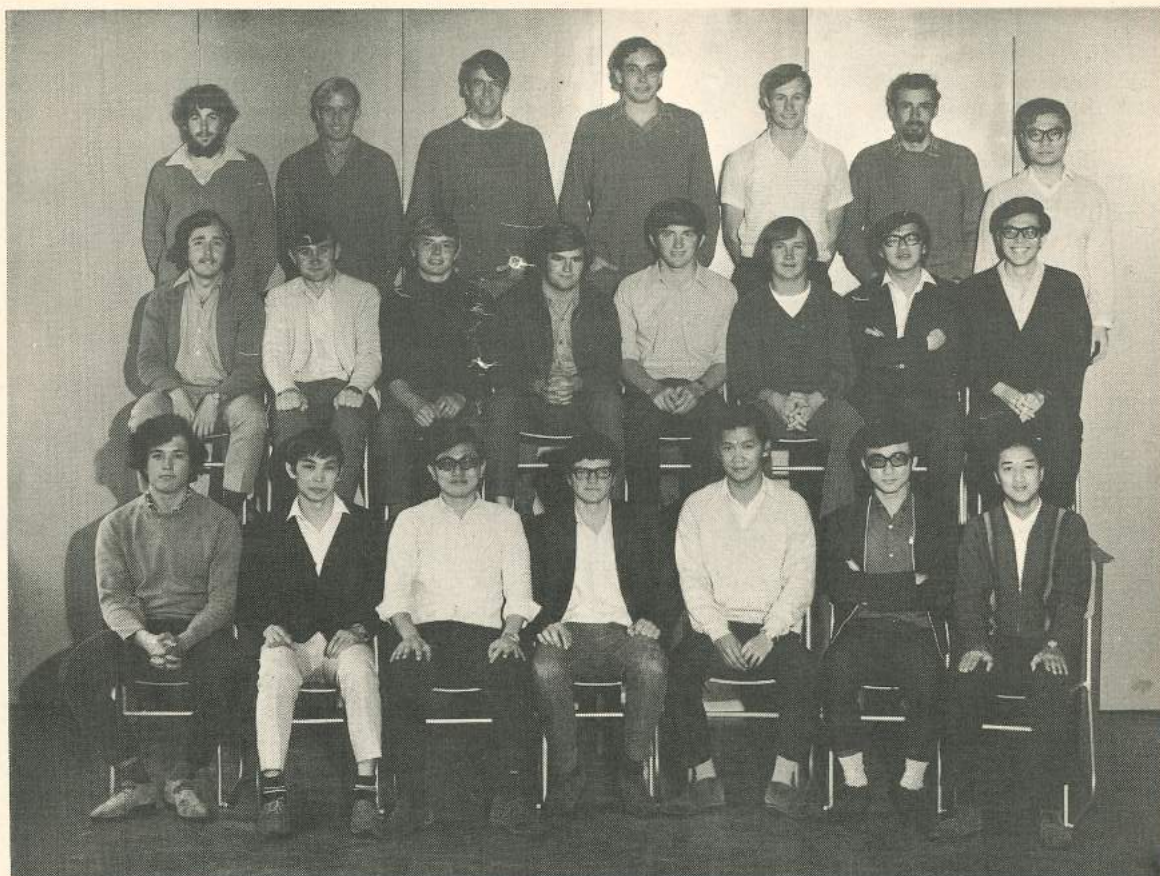
Soo's blooze with High Fidelity.

JEFF COLLETT

B.H.P.'s Iron Man.

JO PLANTE

Bloody bright blonde: three Bs with five As.



K. Gow, I. Lindquist, D. Pullan, C. Letham, N. Probert, E. Slot, S. Ong, P. Lutton, F. Cordingley, R. Nicholson, M. Walters, I. Thompson, G. Pugsley, C. Goh, C. Wong.

J. Barrett, M. Goh, Y. Chen, C. Crisafulli, Y. Chew, H. Ng, K. Loh.

THIRD YEAR MECHANICAL

JIM BARRETT

Horses, horses, horses — don't mention horses near me again. But how else do you circulate foreign capital?

CHEN YING

Ver-r-y interested! Brylcream: a little dab'l do yer.

CHEW "LONG TIME"

5 A's man and the Nog's guru. Has great insight, not only academically — has bought a pram which is hidden under his bed.

FRANK CORDINGLEY

Squadron man. Latest convert to the circuit dervishes, supplementing an enshrouded love life.

KEN GOW

Proudly wears the third year Mech beard. Frank's soul-brother; they crawl together through car magazine.

GOH, M.C.

Comes from the land of the jungle bunnies.

BERNIE GOH

Aggressive. Wears high heels when playing table-tennis.

DAVE LETHAM

Married his childhood sweetheart, December 1971. We wish the diminutive Vanessa, a trainee kindergarten, the best of luck and all the happiness a cadetship can bring.

IAN LINDQUIST

Squadron man and public servant. Cool clear Swedish blue. Has contacts in the financial world. His only eccentricity is green paper.

LOH KOK LEE

Simon St. Colombia — Put your hands on your head: You're out.

NEV PROBERT

Objects strongly to the pubics in Playboy, so strongly in fact that he has to stand on his head in the Roman Rings to keep down his objection. Also strong on initiations.

PUGSLEY

Had a haircut from Jo Plante and has never recovered. Has a gallery of photos of himself with other guy's birds. Takes everything out on Nicholson.

ROGER NICHOLSON

Is coming back from Malaysia after this Christmas. Hope he's got it by then. Squadron man with pikkies of himself in a Macchi.

DAVE PULLAN

Has his time cut out telling Jo when she's out a line. Another Squadron man.

ERIC SLOT

A Dutch Draft Dodger who has resisted the "circuit boys", swearing by his own form of a.m. calisthenics. A kept man.

CONRAD CRISAFULLI

"Forty-four gallon drums are cheaper." Gets the seven-year itch fortnightly and makes a Bee-line for Cue. Did a good job of organising both the Ball and the Dinner.

GINANDJAR

Smiles and speaks like an Indonesian princess but is something else on two wheels.

PETE LUTTON

Has hair and like all celebrities owns a beagle.

ONG SIN WAH

Owens a 1950 Morris which climbs trees and stops to watch every intersection.

NG "POPEYE"

Alias, ING, ENGEE, NOG and NEG. Is a tin-mining tycoon from Malaysia. Lateness is his trade-mark.

IAN THOMPSON

President of the Gliding Club. Thomo has faith-

fully attended the Reid Library in anticipation of the "Escape Stairs Miracle." May his tongue not be tied.

WONG CHEOW KIM

Known to May Ling Ng as "Kimmy Boy" and skips Maths lectures every Friday.

MIKE WALTERS

Scratch golfer and gun duck shooter.

WONG CHOONG KEE

Gong! Phantom blackboard scribbler. Say quickly: "Back in Calcutta my people are starving."

APPLEYARD

Has ironed out any performance wrinkles. Would be a hard character to tie down.

COLE

Beaver-r-r-r!

JOHNSTON

Like Everest, chaps, has conquered Stats.

NOYES

No questions? No! Next topic

SWIFT

Designs his machines for his lily-white breasted girls and has a way with elephants. Elephants he adds nose to tail, like vectors. From Sheffield Zoo.

WAGER

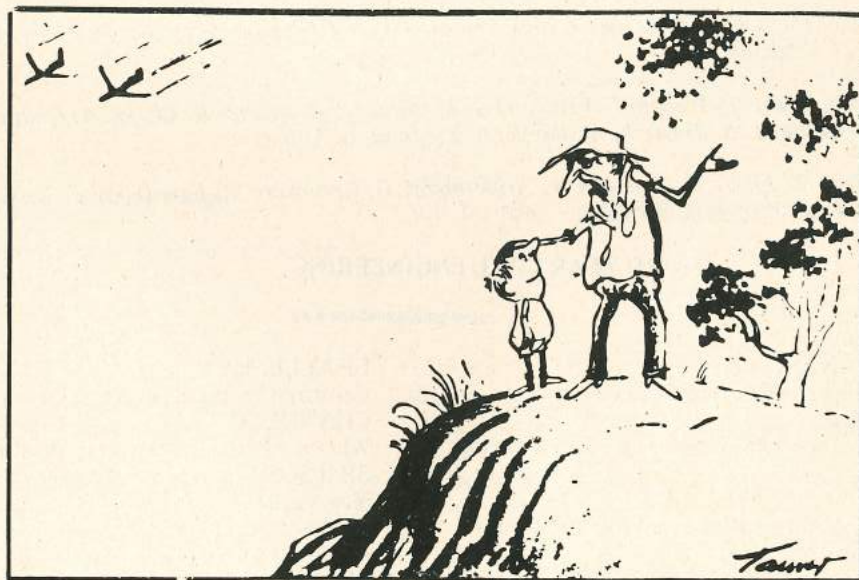
Haunted by pulsating amoeba cogitating their pragmatic constraint, and many others may be found in Roger's book of pearls.

WIDDEN

Give Peace a Chance.

TAYLOR

A new boy - as yet his foibles are unknown.



'Learn to use nature's clock — look at the sun, note the position of your shadow, and every hour on the hour two airliners will fly across it.'



P. Storey, K. Baker, W. Limpaseni, E. Jensen, M. Hillman, I. Chandler, P. Lemish, R. Salter, P. Taplin, R. Thorpe, T. Strahan.

M; Talianchich, G. Walker, G. Dundas, P. Marchesani, C. Pascoe, S. Foster, M. Gorman, S. Hungspreug, C. Ingham.

K. Neanchaleay, P. Waugh, G. Fitzpatrick, P. Cordin, P. Darrigan, K. Chang, A. Chung, P. Suwanvitaya, S. Meyrick, M. Payne, E. Englund, G. Milne.

B. Nilsen, K. Imms, R. Simpson, V. Ariyaparakai, G. Greenacre, K. Law-Davis, P. Canaway, T. Anekpuritanang, C. Stewart.

THIRD YEAR CIVIL ENGINEERING

ANEKPURITANANG

Geological slump in test — no "A", eh?

ARIYAPRAKAI

Yes, yes, yes — let's go down to Myer Street during surveying.

BAKER

Ken and his car both suffer from big end trouble.

BARNETT

Found a fifty cent piece, but the U.E.C. couldn't afford her.

CANAWAY

Who killed Cock Robin?

CHALLENGER

Censored by the Right Honourable Mr. Chip.

CHANDLER

Who wants to buy my body for a dollar?

SIMPSON

Yes, please!

CHANG

Co-ed soccer man.

CHUNG

Quite quiet smiler.

COFFEY

His acid wit reached all time high at August ball.

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A. Choong, P. Knox, A. Stacey, J. Uusioja, T. Poepjes, K. Harvey, S. Khio, B. Burton.

W. Subroto, D. Pryce, C. Tham, J. Leong, R. Thorton, P. Morgan, J. Mason, C. Lee.

P. Grey, D. Nicholson, J. Allen, Aw Soo, Miss I. Noridah, A. Gobolos, R. Van der Ruit, B. McKimmie, S. Liblich.

Dr. B.G. Leary, Dr. D.H. Steven, Dr. J.V. Fall, Prof. A.R. Billings.

FOURTH YEAR ELECTRICAL AND ELECTRONIC

If for nothing else, the above-mentioned group was unique in being the first to include undergraduates in both the electrical and the recently introduced electronics courses; the distinction between the two being obscure, even to those of us involved. The struggle for graduate status helped to pass the year quickly with preoccupations including DIGR, the infamous programme penned by Dr. Mills, and the student seminars of which James Leong's musical comedy "Magneto hydrodynamic power generation" produced the most interest.

Dunc Steven spent the year demonstrating the value of block diagram electronics while Scolaro drove the class into an excited frenzy with switching theory. Pete Morgan waited expectantly

during the second term for his new yacht, which upon launching developed more leaks than Ken Harvey after the Engine's dinner. Jim Mason bore the dubious distinction of being the only one of the group to own two cars, one of which he carried in the boot of the other in preparation for the odd road-side emergency.

Dr. Bundell remained complacent as Rob Thornton and Aw Soo systematically reduced the number of synchronous motors in the machine lab; while upstairs Dave Nicholson had his second term project terminated by a hostile power supply. Ron Van der Ruit matched up kills on the social scene faster than Steve Liblich collected speeding tickets and Ole Stacey, bewildered by Dr. Leary's

In conclusion, we wish the staff a rapid recovery and anticipate their continued perseverance in the face of abominable ignorance.

The only time he is early for lectures is when his car broke down. Also planning a terrible revenge for the police radar trap.

Likes his drinks: he likes to have his fishing and music on the rocks. Twenty cents to the first one who spots him without the HI-FI Annual.

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N. Lau, J. Eattell, P. Andruszkiw, J. Christou, R. Dunstan, R. Eddington, G. Hesford, K. Collins.

D. Allan, R. Maloney, D. Raymond, K. Chan, S. Ng, B. Douglas, A. Usman, P. Blennerhassett, H. Tey, R. Spence.

S. Treesuwan

C. Yeo

Mr. J.A. Cole, Mr. J.G. Cuming, Mr. W.A.C. Swift, Dr. J.G. Wager, Mr. G.G. Lutz, Mr. M. B. Widden, Mr. R.C.R. Johnson, Dr. K.J. Taylor, Mr. R.B. Noyes.

FOURTH YEAR MECHANICAL ENGINEERING

RON SPENCE

Lives in the Library. Known to enjoy hockey and women.

KEITH COLLINS

Easy-going, unruffled young man who has given up smoking his own cigarettes.

DAVE ALLAN

Enjoys married life and who can blame him. Quietly smooth. Holds the record for longest seminar.

JOHN CHRISTOU

Another married man. He is as at home with words as he is with gears.

BRUCE DOUGLAS

Functional dresser who has been known to express himself vehemently on topics such as class distinction.

GEOFF HESFORD

Has found that keeping an Alfa Romeo and a woman stretches the engineer's pay packet. Injury prone.

Has a question for every statement, and discussion time during Seminars became known as "Maloney's Half Hour."

Known to like Playboy jokes and Playgirls. Never lost for words.

Quietest member of the group who has a smile for most of us — even Ross.

Sleeps during the day, works during the day. Judo expert extraordinaire, so not to be argued with.

Smooth, suave and often leather jacketed. Sure to get on.

A St. George's man who dabbles in Fluid Mechanics.

Pleasant, easy-going and is always ready to share his lunch with the College students between lectures.

Always friendly, even under pressure. Prefers living at Kingswood to living in the real world.

Long distance runner from Fremantle. Rides a bike; yet to be overtaken by police.

Shortest member of the class but one of the perkier. Keeps Keith and himself in cigarettes.

Dabbles in Engineering, politics, cricket and football. Likes Thermodynamics and women.

Likeable young soccer player who has given up shaving and is hoping to grow a beard.

The "Cowboy" of the class. Another two-wheel fanatic who travels faster than the speed of sound.

Drives a Cooper "S" at great pace. A mechanical whiz kid who says little.

Completes the year's married group and like the others, is happy with it. Silly fellow; because the bachelor group knows better.

Quite and likeable. A patient design student who is smart enough to know that riding around campus is easier than walking.

Always active, always working. Another smoker who contributes to Keith's cause.

"Outstanding-Performance-of-the-Year" Award for his off-the-cuff Seminars on lasers, aeolian power...

Believed to have studies Latin, French, *etcetera*, *ad hoc*. Possesses *de sapientia veterum*. Could make a fortune from aeolian devices to travel into the wind if Someone Up There could switch off the fan, momentarily.

Inherently a stable system despite random vibrations and white noise from within his domain. Meccano Ltd. has been superseded by Plessey Inc. for tuition of retarded fourth year students.

Obviously has a complex about his tie knots as his hair becomes shorter and his beard longer. Has guided the ignorant through the stormwaters of Seminars, Fluids and related topics in grand academic style.

Excellent export quality. Faithful to his troops with an ardent desire to go over the exam paper again..... and again..... Obviously operates at the lowest stress index of all his colleagues.

A great stayer to outstay all and sundry at staff-student gatherings. Footprints on the blackboards and walls of A134 could suggest a cramped lecture

Takes the prize for class communication. Who else could conduct his Thermo's tutorials from the professional boardroom, then instill fear of countless failures at our last gathering. To be presented with a silver-framed photograph of his 25th Non Loqui sitting.

Definitely not a stayer. Suicidal despair at his class's ignorance has driven him to greener academic pastures.

Showed financial expertise which indicates that his fiscal genius is wasted in the Engineering field.

The unflappable. Obvious success as a consultant has landed him on Ponderax and enforced a sad stay in St. John of God's Hospital. Well wishes from us all.

ANOTHER imperturbable consultant from the outside world. Relished the opportunity to deliver tutorials to the usual attendance of one student, and even more, he always stayed for 45 minutes. No wonder he's successful.



D. O'Connell, M. Croy, M. Appelt, W. Edwards, G. Properjohn, G. Abbott, C. Pollett, G. Edwards, T. Chan, K. Ang, N. Cinquina, J. Hewett.

C. Fitzhardinge, R. Becu, L. Walker, J. Greenwood, R. Candy, A. Priolo, J. Naunton, K. Lynch, R. Smith, G. Ossolinski.

L. Rho, I. Pineira, D. Crawford, G. Milward, R. Hale, A. Formato, G. Hunt, M. Tarca, R. Johnson, I. Hutton.

Mr. T. Watanatada, Dr. B. Clegg, Mr. G.C. Reynolds, Mr. J.R. Espie, Prof. K.L. Cooper, Mr. R. Sacks, Mr. R.H.B. Hebbert, Mr. D.M. Devenish, Mr. J.J. Van der Meer.

FOURTH YEAR CIVIL

ABBOTT

Greg wasn't quite stabilized after discovering mixed showers at Aquarius Arts Festival.

ANG

Anguished angular angler Ang angles angrily.

APPELT

Mark is a conservative conservationist who doesn't like roads following kangaroo tracks.

BECU

Plays football sitting down. Was really cut up about pumping long chain molecules.

CANDY

Russ challenged Sacks for the ill-spent hour award with a super long seminar.

CHAN

Charming character Charlie Chan cherishes choice chopped Chinese chickens. Has a weekly hair cut from his betrothed.

CINQUINA

Nick can best be classified by his key words:— twin towers of sin; GTR; Miss Take; C.R.A.P.; Shadrach, Meshach and Abednego.

COX

John is current holder of the "Body Beautiful" and "Standing Bacardis" titles. Runner up in the "lecherer of the year" competition.

CRAWFORD

Don spent his spare time passing water through box culverts. Attained his majority at a house of doubtful nature.

CROY

The wheels on Max's beach buggy are so wide they overlap. Designs sewers for a once-in-a-hundred-year diarrhoea. Activated sludge is finger-licking good.

DEEGAN

Lance is a little arty but only optionally historical.

RHO

Lou finds curves and undergrowth aesthetically pleasing. Had the "Trots" at Bunbury.

SMITH

Bob carries a library in his car, the roof of which was somewhat depressed after country week football. Has great faith in the tensile stress of bitumen.

TARCA

Mike, the PDP kid, was seen at the Ball with a married woman. Claims they are just good friends.

WALKER

Lach had trouble with his glands and still is Morry-bund. Had a severe attack of indigestion from incentive beers.

EDWARDS

George is still trying to grow a beard, but now has 21 hairs.

EDWARDS

Wally claims sewerage lagoons smell sweet, not PEARCINGLY offensive. Believed to be anaerobic as he is over 4 feet deep.

FARRELL

Main Roads jet-setter, Ross doesn't quite appreciate the Engineering environment.

FITZHARDINGE

Fitz knows he can't sing but loses his memory after one pot. Known in some circles as "Fitzhardinge the Great 2.8" — and that's fully extended!

FORMATO

To play in Gus's soccer team you needed a passport. Frustrated because he got stopped in the middle after piling for an hour.

GREENWOOD

Jeff depreciated rapidly after the Dinner but managed to present a tuxedoed Seminar before collapsing. Hasn't been the same since Deb came instant.

HALE

Ray never manages to stay up late. Left the Ball at 10.00 p.m. to sally forth. Has a racing hot-rod. Secretly known as Zieg! Hale!

HEWETT

Dave allowed the class to dress in civvies for his Seminar. His bird took a hurried trip East after local manoeuvres.

HUNT

If the price of beer went up Greg would starve. Driven to drink after eating at Merv's. Quotes Rye buck Shearer more than occasionally during Hunt's null time.

HUTTON

Merv liked his independence so he got married. "Daddy who?" Daddy Merv.

JOHNSTON

Bonno is a dinkum Aussie. Hairstyle by "House of Lords." He limits conversation with Body Beautiful to "bewdy too!"

LINDEN

Bert and Luigi Nervi design by instinct. Slept in areas unknown on the South-West tour.

LYNCH

Keith's designs are all or nothing. Often heard to say "I think that is stupid."

MARTIN

After having his hair and his FJ yellow stickered changed his image to a clean family man.

MILWARD

Graham came back with a grin from ear to ear after the August vacation. Wipes himself out occasionally so he can appreciate clean living.

NAUNTON

International playboy turned footballer. Gets his kicks at R.P.H. nurses' home.

O'CONNEL

Dan, Dan the lightweight concrete man. One of the four blends of super-mucks.

OSSOLINSKI

George drinks bourbon and "Curly-pet".

PINEIRA

Ian's options are Womanising 48, Soccer 100 and New Zealand 23.

POLLETT

Chris is trading his hot mini in on a lowered pram. Lost his big asset when he shaved off his mo.

PRIOLO

Tony actually grew an actual mo, after three week's actual growth.

PROPERJOHN

Geoff is going to Darwin, his bird is going to Darwin and he still can't beat Wally at Golf.

REYNOLDS

"12 inches, that's the maximum, and I'm going to stick it up as far as I can."

DOYLE

"The death rate still goes on mainly as a result of people being killed."

MATTHEWS

"Anybody miss out?" at a Monday lecture: Cox, "I got mine."

SMITH

Almost "lynched".

CLEGG

Delivers his lectures like his darts: underhand.

HEBBERT

Doesn't lay culverts very often.

Abdullah M.B.
 Aberle D.T.
 Abu Bakar M.N.B.
 Abu Bakar M.S.B.
 Archer G.E.
 Artelaris S.C.
 Barry J.P.
 Bayens H.
 Beale K.A.
 Bell C.G.
 Bellemore J. (Miss)
 Bennison S.G.
 Binh Le Nguyen
 Black M.
 Boekelaar R.J.
 Botica C.J.
 Bowron K.D.
 Bowyer P.R.
 Bradshaw C.M.
 Bradshaw R.E.
 Bretnall R.
 Brown G.D.
 Brown K.W.
 Buchanan J.R.
 Burbidge C.J.
 Calneggia F.L.
 Carr M.E.
 Carroll S. MacE.
 Cecich M.
 Chang King Hon
 Chapman J.D.
 Chapman R.H.
 Cheah Sam Keat
 Cheyne J.C.
 Chim Pong Fai
 Chiong Wei Shiong
 Choo Chuan Chai
 Choo Eng Aw
 Chung Kong Yin
 Clarke A.E.
 Clarke E.H.
 Clarke R.E. (Miss)
 Clayton C.G.
 Clifford P.J.
 Collins G.R.
 Collura S.
 Conway D.V.
 Costa A.F.
 Courtis L.R.
 Cross A.N. (Miss)
 Crowe J.G.
 Cullity D.T.
 Cunningham D.B.
 Cusmano F.
 Dale J.D.
 Darcey W.A.
 Davies T.W.
 Davis C.G.
 Davis P.F.
 Dilizia A.P.
 Doan Hoang Bang
 Dong Nhan Trung
 Doropoulos L.
 D'Rozario W.T.M.
 Dunn M.P.
 Duong Nguyen Huy
 Dyer D.A.
 Dzieciol W.G.
 Edwards E.W.
 Eggett M.J.
 Elliott R.W.

Elshaw W.E.
 Ewing P.A.
 Ferguson P.L.
 Firios N.
 Fitzgerald B.W.
 Fleay W.E.
 Foo Choo Shong
 Foo Seow Fong
 Foote R.J.
 French M.J.
 Gadd C.B.
 Gardam J.R.W.
 Gardner M.K.
 Gartner J.C.
 Gilbert D.J.
 Gilbert T.P.
 Glasheen B.M.
 Glover R.I.
 Golja B.J.
 Gould T.G.
 Gow P.W.
 Green M.P.
 Green T.W.
 Gutmanis I.
 Haggerty B.C.
 Hammond R.S.
 Hanslip D.C.
 Hardie C.E.
 Haron Raja A. Bin
 Harry S.P.
 Hastings L.R.
 Hill A.D.
 Hinkley D.B.
 Ho Pay Chee
 Hondros S.
 Hosken D.L.
 Hubble F.G.
 Hughes B.J.
 Hughes G.J.
 Ip Sheung Sze
 Issakov M.J.
 Ivey G.N.
 Jackson T.D.C.
 Jacob P.K.
 Jacobs W.J.H.
 James H.W.S.
 Jarvis B.R.
 Jeffries D.A.
 Johnson J.G.H.
 Jones B.
 Jones L.H.
 Joss G.L.
 Judge B.R.
 Kang Ngeek Kong
 Keating T.J.
 Kerr A.J.
 Khai Phan Thien
 Khong Heng Min
 Kimber R.W.
 King T.C.
 Kok Kee Fatt
 Krishnasamy G.M.
 Laan B.R.A.
 Lake B.D.
 Landro C.B.
 Langford Jas. A.
 Lee Hoe Kok
 Lee Kah Lek
 Lee Thong Chai
 Leung Chi Keung
 Lewkowski G.J.

Lim Kok Fai (Chris)
 Lim Lee Chat
 Lim Weng Mee
 Litchfield R.T.
 Low Hock Chye
 (Lawrence)
 Loxton R.C.
 Mah Kai Leong
 Maley I.J.
 Maloney F.J.
 Manzi A.
 Massy T.J.H.
 Masterson S.P.
 Mat Salim bin
 Medbury R.C.M.
 Meloncelli J.L.
 Mildern L.B.
 Minchin D.B.
 Morley A.H.
 Mubarak Ali Masood
 Muller C.F.
 Muoi Tran Van
 McCluskey P.
 McGilligan M.D.
 McKay M.L.
 McLernon A.
 McLernon J.E.
 McManis T.J.S.
 McManus L.R.
 McMurdo R.V.
 McNab J.D.
 Ng Eu Tat Ivy (Miss)
 Nicholson G.J.
 Nieman H.F.
 Noel R.F.
 Notte A.
 Osborne B.S.
 O'Connell G.P.
 Ong Chow Loo
 Ong Huay
 Owens J.W.
 Ozarczuk T.S.
 Packer C.
 Paino P.J.
 Papadopoulos G.
 Pasotti B.
 Pazolli N.
 Pearce G.I.
 Pedrick W.G.
 Pegrum W.R.
 Penrose R.I.
 Piper V.
 Pisano M.B.
 Pitt R.K.
 Rapoport L.D.
 Rayner K.N.
 Rebeiro M.I.
 Reed P.C.
 Robertson B.E.
 Robinson G.A.
 Robinson P.R.
 Ruiz-Avila J.L.
 Scarfe R.W.
 Seng Leang Heng
 Seong Mun Fai
 Shamsudin Megat
 Saharuddin bin Megat
 Siragusa N.P.
 Smith C.F.
 Smith G.R.
 Smith P.J.
 Spilsbury M.H.
 Stacey W.P.
 Stewart G.W.
 Stokes R.A.
 Stone G.E.

Stone R.R.
 Surridge P.W.L.
 Swannell G.S.
 Szoreny P.A.
 Tan Chat
 Tan Lam Pheng
 Tay Chee Hian
 Teh Soo Lee
 Teo Cheow Aik
 Tondut J.K.
 Toomer G.P.
 Tout D.J.
 Tresidder J.D.
 Trezise M.L.
 Tsan V. Hiang Yong
 Turner D.L.
 Vanderbyl S.
 Veale C.M.
 Verrier S.J.
 Vu-Van Van
 Wan Shoo Chiu
 Wan Tet Fong
 (Johnson)
 Watson I.K.
 Wee Tiong Siew
 West K.D.
 White G.P.
 White I.C.R.
 Whitelaw I.E.B.
 Williams P.B.
 Wilson S.H.
 Winsor N.R.
 Wong Hon Fai
 Wong Hon Wing
 Wong Lay Sing
 Wong S.G.
 Woodworth D.B.
 Yang Yau Daw
 Yeap Ming Ting (Miss)
 Yip Put Jan
 Young B.E.

Armanasco P.S.
 Atkinson M.C.
 Baguley L.E.
 Basanovic P.
 Baster P.R.
 Baynes L.T.
 Belford D.R.
 Black B.H.
 Blair D.R.
 Blandford N.J.
 Bradley K.J.
 Bradshaw K.J.
 Broadway G.A.
 Brooks D.S.
 Bryant I.E.
 Cabral D.
 Catto I.D.
 Chan B.S.
 Chatjarernswad S.
 Cheong Choi
 Chew Hung Leng
 Chew Kah Chuan
 Chong Fo Kui
 Chong Fook Loong
 Choong George
 Chua D.T.C.
 Chuah Teong Peng
 Coate M.T.
 Cornish D.K.
 Cosson M.G.
 Crawford M.S.
 Cwiek V.E.
 Denham P.

SECOND YEAR

Denison G.G.H.
Denny I.C.
Djulbic E.S.
Dobson J.R.
Dunn R.W.
Edmonds L.W.
Edwards G.T.
Ferrante G.
Fitzhardinge M.B.
Gardiner C.K.
Gavranich B.B.
Gibson A.J.
Gillett C.J.
Goh Chin Hua
Green C.R.
Grincer A.J.
Gugich J.J.
Hackmann A.H.D.
Hambleton G.N.
Hardy R.J.
Harris P.M.
Hawken P.J.
Healey E.J.
Hemsley L.P.
Hewitt M.I.
Holt G.A.
Johnsen M.T.
Jolly P.B.
Kelliher R.G.
Kelly A.J.
Kendall W.T.C.
King J.C.
King J.H.
Koh Kuek Chiang
Kong Ngie Ming
Kooperman B.C.
Lalli M.A.
Lang G.b.
Lapuma S.L.
Larkins G.K.
Lau Kian Hwa
Leslie R.A.
Lethbridge N.
Lewis S.G.
Lok Chuan Seng
McAuley M.J.
McAuliffe R.A.
Mackenzie P.L.
Madafferi S.
Maley P.M.
Marks P.
Mitsopoulos V.L.
Modra K.C.
Mohamad Anuar bin
Sulaiman
Nadilo K.B.
Olminkhof J.B.
Ong Joo Hong
Patrick N.
Perreau M.E.
Plummer A.M.
Porter J.L. (Miss)
Porter T.G.
Radaich J.P.
Ramsey W.J.
Reklitis M.
Reynolds M.L.
Richardson A.J.
Ruskulis A.J.
Ryan G.W.
Scanlon R.F.
Schladow G.
Scott P.W.
Seckington C.C.
Sheridan D.B.
Silvester R.S.

COURSE C

Smith B.J.A.
Stone K.A.
Tan Boon Chee
Tan Kiew Ping
Thomson W.G.
Toh Say Pheng
Trichilo F.
Unkovich I.T.
Van Dongen A.J.
Vigus C.L.
Voon Tai Chong
Wahab bin haji Dolah
Wake G.S.
Walker R.D.
Wallace J.D.
Walsh P.G.
Wang Jwu Wah
Watson A.McK.
Wilson M.W.
Wong Ching Kuok
(David)
Wong Nam Hua
(Albert)
Yong Tshe Liung

Basell D.H.S.
Calligaro R.H.
Cantoni P.F.
Cargill R.D.
Caro N.W.
Coghlan R.L. (Miss)
Done M.E.
Foster W.
Gummer A.W.
Honeyman A.D.
Hong Choon Leong
Ithisariyanont T.
Johns G.S.
Lau Geok Hong
Leivers J.
Lim Ah Ter
Lim Jitt Boo
Lindsay D.A.
Lukas F.X.J.
Malaspina P.
Nichols R.G.
Nind E.P.
Norman M.J.
Noteboom F.J.
Oma G.L.
Orkney K.R.
Schmidt D.J.
Shakhovskoy P.
Teh Thean Hong
Thank Nguyen Hoai
Turnbull G.A.
Wisitwatanawong S.

Canavan P.
Douglas P.C.
Dow M.W.J.
Eng Meng Swee
(Martin)
Goode C.W.
Lee Heng Yip
Leung Chi Hong
Liew See Leong
Lim Beng Yeow
(Andrew)
Lim Kok Lai
Mandavy E.
Meharry D.S.
Mills A.M.
O'Sullivan D.S.

COURSE B

THIRD YEAR CIVIL

THIRD YEAR MECHANICAL

Pickersgill H.S.
Puhl T.S.J.
Raich V.
Sellner T.B.
Smith M.G.
Weaver I.J.
Zaknich A.

Barrett J.A.
Chen Ying
Chew Yong Tian
Cordingley F.E.
Crisafulli C.W.
Ginandjar P.
Goh Chee Aik
Goh Meng Choon
Gow K.N.
Letham C.D.
Lindquist I.D.
Loh Kok Kee
Lutton P.F.
Ng Hock Hai
Nicholson R.K.
Ong Sin Wah
Probert N.J.
Pugsley G.O.
Pullan D.A.
Slot E.G.
Thompson I.R.
Wong Cheow Kim
Wong Choong Kee
Walters M.O. de C.

Anekpuritanang T.
Ariyaprakai V.
Baker K.J.
Barnett P.B.
Canaway P.
Challenor H.A.
Chandler I.J.
Chang K.S.A.
Chung A.Y.E.
Coffey P.S.
Cordin P.G.
Darrigan P.R.
Dundas G.S.
Englund E.A.
Fitzpatrick G.M.
Foster S.G.
Gorman M.R.
Greenacre G.S.
Hillman M.O.
Hungspreug S.
Imms K.J.
Ingham C.T.L.
Jayasuriya A.M.
Jensen E.B.
Kehoe J.D.
Law-Davis K.H.
Lemish P.J.
Liang B.H.
Limpaseni W.
Longley J.F.
Marchesani P.
Meyrick S.J.
Milne G.P.
Morris W.J.
Neanchaleay K.
Nilsen B.O.
Pascoe C.S.
Payne M.J.B.
Rafferty G.F.
Salter R.

THIRD YEAR ELECTRONIC AND ELECTRICAL

Simpson R.N.
Stack P.R.
Stewart C.K.
Storey P.J.
Strahan T.H.
Suwanvitaya P.
Talianchich M.M.
Taneerananon P.
Taplin P.N.
Thorpe R.J.
Tresidder G.A.
Walker G.P.
Waugh P.J.

Clifton P.J.
Collett G.L.
Hirst J.C.
Jarvis J.W.
Lansell S.V.
Ng L.L.
Ng R.
Scolaro R.J.
Southwell P.J.
Steele R.A.
Wong K.L.
Yates D.
Zambotti B.

Burr M.J.
Carpenter R.J.
Chin E.W.Y.
Davis M.J.
Dee P.K.
Faraone L.
Ferguson R.C.
Fouracres T.J.
Georgakakos G.
Gibson R.D.
Griffiths P.R.
Howe R.J.
Kachwalla Z.
Kwan W. C-Y.
MacPherson J.D.
McNaught B.W.
Mounsher N.J.
Ng A.E.
Pearce D.C.
Piper A.
Plante Miss J.J.
Reed R.P.
Salleo V.P.
Sallustio A.
Sargent P.R.
Stephens A.R.M.
Threleall H.J.
Tytherleigh G. St. J.
Whiting S.N.

FOURTH YEAR MECHANICAL

Allan D.E.
Andruszkiw P.
Basuki J.
Blennerhassett P.J.
Chan Kum Eo
Christou J.V.
Collins K.D.
Douglas B.M.
Dunstan R.J.
Eattell J.P.
Eddington R.I.
Gardner P.E.
Hesford G.A.
Lau Jui Kwong Nicholas
Maloney R.J.
Ng Sau Weng
Raymond D.J.
Spence R.E.
Taylor B.R.
Tey Hiang Siong
Treesuwan S.
Usman A.K.
Yeo Cheow Tong



Abbott G.B.
Ang K.L.
Appelt M.A.
Becu R.D.
Candy R.I.
Chan T.Y.
Cinquina N.
Cox J.R.
Crawford D.I.
Croy M.W.
Deegan L.
Edwards G.
Edwards W.J.
Farrell R.G.
Fitzhardinge C.B.
Formato A.
Greenwood J.M.
Hale R.W.
Hewett J.D.
Hunt G.F.
Hutton I.M.
Johnson R.
Linden A.H.
Lynch K.O.
Martin G.R.

FOURTH YEAR CIVIL

FOURTH YEAR ELECTRONIC AND ELECTRICAL

Milward G.
Naunton J.F.
O'Connell D.
Ossolinski G.
Pineira I.M.
Pollett C.G.
Priolo A.
Properjohn, G.E.
Rho L.A.
Smith R.B.
Tarca M.J.
Walker L.D.



Allen J.A.N.
Aw Soo
Burton B.W.
Choong A.T.C.
Gobolos A.Y.
Harvey K.F.
McKimmie B.R.
Mason J.K.
Nicholson D.C.
Noridah Miss I.
Poepjes T.T.
Stacey A.O.
Subroto W.
Tan W.S.
Tanner F.A.
Tham C.K.
Thornton R.G.
Uusioja J.

Grey P.T.
Khio S.
Knox P.R.
Leong J.T.K.
Liblich S.
Morgan P.W.
Pryce D.V.
Quai D.
Toffoli B.
Van Der Ruit R.
Yee C.L.

SOLUTION TO DESERT DILEMMA

As every good engineer knows, a bag of common plumbing tools contains a blowtorch. To discover the direction of water flow you heat the pipe then determine the direction in which the heat has been conducted further. Since the pipe will be heated further in the direction of flow of the fluid being transported you are as good as saved. (Providing, of course, that you remembered to bring a cut lunch and a waterbag as well as your plumbing tools).

RIGHTS



"ANOTHER BEAUTIFUL DAY - WHAT A MAN NEEDS IS A DEEP BREATH OF ..



..bleh...



..quick..quick...



..a glass of water..



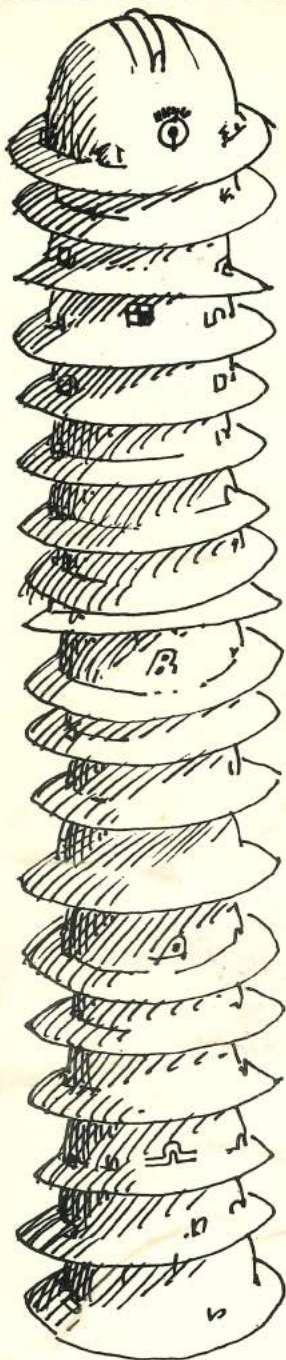
MAKES A MAN FEEL GREAT TO BE ALIVE...



.. Makes a man feel LUCKY to be alive..

"..... And he smiled a kind of sickly smile,
and curled up on the floor,
And the soldiers even proceedings interested
themselves in him."

LEWIS CARROLL



Why should you be a BHP engineer when you can pick and choose?

For one thing BHP activities are so varied and widespread that we can offer you a career in a very wide range of engineering fields.

For another, you'll be taking your place in a big, vigorous company that never stands still. Engineers have always played a major part in BHP's expansion.

BHP can make good, satisfying use of your skills and enthusiasms in enterprises all over Australia and our staff planning makes sure that your best talents are not overlooked.

Why not come and talk it over with us at 500 Bourke Street, Melbourne, or at any of the Company's Works or Branches.



MINING, STEEL, OIL & GAS

